

## WEATHER IN THE UNITED STATES

## THE WEATHER ELEMENTS

By P. C. DAY

## GENERAL CONDITIONS

The month was notable mainly for high barometric pressure over the East and Southeast, mild temperatures, particularly during the first half, and for the general absence of inclement weather over most sections.

## PRESSURE AND WINDS

High pressure over the Atlantic coast districts effectively blocked the usual progress of storms moving eastward from the Mississippi Valley and most of these were forced first to the Lake region and thence eastward north of New England, with resulting lack of precipitation for long periods over many eastern districts.

The first few days were mainly free from important precipitation, but by the 4th cyclonic conditions had set in over the middle and upper Mississippi Valley and by the morning of the 5th considerable precipitation had occurred in that area and to the eastward as far as the Great Lakes and Ohio Valley. By the following morning pressure had increased materially, but light precipitation continued eastward to the Atlantic coast and southward to the Florida peninsula, though in diminishing amounts. With the exception of light precipitation over the Lake region and to the eastward, no other important precipitation occurred in any part of the country during the first decade.

By the morning of the 11th pressure was again falling over the Great Plains and to the southwestward, and some snow or rain was falling over the northern mountain districts and in the western Canadian Provinces. This pressure distribution brought precipitation by the morning of the 12th, generally light, however, over an extensive area from central Arizona, New Mexico, and western Texas northeastward to the upper Lakes and continued locally westward over portions of the Rocky Mountain region. High pressure over the Southeastern States barred the progress of the low pressure into that region and precipitation therefrom continued locally in the mountains of the west and in the Lake region and northern New England. Following this low pressure again formed over the Southwest and moved to the Mississippi Valley by the morning of the 15th, and by the following morning the most widely extended rain area of the month had covered nearly all parts of the country from the Mississippi Valley to the Appalachian Mountains and to the South Atlantic coast. The rainy conditions remained fairly stationary during the following two days and finally passed northeastward into Canada by the 19th. This was the most extensive storm of the month and brought the greatest part of the precipitation over large areas.

By the morning of the 21st low pressure had again developed over the southern plains and in its passage thence to the Great Lakes by the 24th considerable rain occurred from the Mississippi Valley eastward to the Atlantic coast, the falls being fairly heavy in portions of the Gulf States and locally in the Ohio and middle Mississippi Valleys and Atlantic Coast States.

Considerable precipitation occurred from the Ohio Valley northeast to New England on the 27th and 28th and over the southern Great Plains on the 29th and 30th, the rain area extending on the 31st westward into the southern mountain and plateau regions.

The far Western States had mainly little precipitation save over the coast districts from central California north-

ward about the 3d to 5th, continuing over the more northern district for several days, but mostly light, and over the same districts from about the middle to the end of the second decade. The last decade had little precipitation in the far West until near the end, and during the same period much clear weather prevailed over other portions of the West, and in fact throughout the country as a whole.

Anticyclones were somewhat dominant, but as they were most pronounced in the lower latitudes they exerted no great influence in lowering the temperatures, except about the 11th and 12th when a rather strong area of high pressure, moving from the Canadian Provinces extended into the Missouri Valley and eastward along the northern border, brought a sharp lowering of the temperature over most northern districts.

The latter half of the month had more frequent incursions of high areas from the Canadian Provinces, and while temperatures were not decidedly low yet the weather was distinctly cooler than had prevailed earlier in the month.

Compared with the normal the mean sea-level pressure was above in nearly all parts of the country, and it was distinctly higher than normal over most eastern and southeastern districts. The pressure was also almost universally higher than prevailed during the preceding month, and this condition existed in Canada as well.

The presence of anticyclonic conditions favored an unusually stable condition of the atmosphere and storms were infrequent as is often the case in mid-autumn. No loss of life was reported and only limited damage to property resulted from high wind or other manifestations of atmospheric stress.

The distribution of the average atmospheric pressure and the prevailing direction of the wind are shown on Chart VI, and the departure of the mean pressure from the normal and the changes in pressure from the preceding month appear as insets to Charts II and III.

## TEMPERATURE

Except in the Plateau States, where both months were warmer than normal, the October departures of temperature were almost always the reverse of the September departures. Especially from the Plains States eastward October was mild, while September there had been cooler than normal.

The opening decade of October was considerably warmer than normal in nearly all districts, particularly between the Mississippi River and Rocky Mountains. During the week following the weather continued warm in far more than half of the country, with unusual warmth for the season in the central valleys, where temperatures averaged mainly from 10° to 15° warmer than normal. This week was cool, however, in the far West and in those central districts near the Canadian border.

The week from the 16th to 23d was particularly warm in the Northeast, and was mainly warmer than normal elsewhere, save in the Plains States and the near Southwest and on the immediate Pacific coast. The last eight days of the month were cooler than normal east of the Mississippi River, also in the northern and middle portions west of the river to the Continental Divide, and again in most of California; this period was quite warm, however, in the plateau region and the Rio Grande Valley.

October as a whole was warm except in the upper Missouri Valley and the northern Rocky Mountain States

and along the Pacific coast. The excess was large, usually 4° to 6° per day, from the southern lake region southward, to the Gulf and southwestward to the Rio Grande, also in the southern Appalachian districts.

In Oklahoma the month was the warmest October of the nearly 40 for which means from well-distributed stations have been computed, and from Mississippi to New Mexico it was among the warmest Octobers.

The highest temperatures usually occurred about the 9th to 14th from the Dakotas and Nebraska eastward to the Middle and North Atlantic States, the marks reached on the 10th to 12th from the middle Missouri Valley to the lower Lake region being at many points the highest October temperatures of record. In the western Cotton States the 1st was usually the warmest day and in the eastern either the 6th or the 7th. The highest marks in the far West were noted about the 6th to 8th. The highest temperature recorded was 110° in interior southern California, on the 7th.

The lowest temperatures occurred usually during the final week, save just before the middle of the month in California and many Plateau and Rocky Mountain States and during the first half of the final decade in the majority of the Plains and Gulf States. The lowest temperature reported was 3° below zero, in central Montana, on the 29th. Temperatures below freezing were recorded in some portions of all States save a few Southeastern and Middle Gulf States.

## PRECIPITATION

Save in a portion of the extreme Northwest and from Oklahoma and Arkansas northeastward to the southern part of the Lake region, the early and late portions of the month brought little rain, yet the time distribution of the rain, coming mainly about the middle of the month, was not unfavorable, on the whole. The geographic distribution was notably favorable. The Atlantic States, where September had been so wet, received less rain than normal; from Virginia to southern New England the shortage was especially marked. Louisiana and Texas, which had excesses during September, had moderate deficiencies in October.

From California and Oregon northeastward to Montana and North Dakota a shortage of precipitation in October followed a deficiency in September. In California the October precipitation averaged less than one-third of the normal.

Between the Appalachians and the Rockies, also in the southern plateau, there was more than normal precipitation nearly everywhere, save near the Gulf and along the Canadian boundary. The excess was considerable from Wisconsin, Iowa, and Nebraska southeastward to Tennessee and Arkansas, save that the Ozark region in Missouri had a deficiency.

## SNOWFALL

The October snowfall covered less of the country than usual and especially it was scanty as a rule, in the more northern States from Minnesota and Iowa eastward.

About the 10th to 13th considerable snow fell from southwestern and south-central Montana and southeastern Idaho south eastward over Wyoming and parts of the States adjoining. At Lander, Wyo., the fall at this time was 22 inches and the ground remained covered for more than 10 days. At the very end of the month a noteworthy fall of snow occurred in Nebraska and southern South Dakota, with most of Wyoming and parts of Colorado and Kansas.

The elevated portions of the middle Mountain and Plateau States seem to have had somewhat more snow than the average October amounts indicated by past seasons.

## RELATIVE HUMIDITY

The percentage of relative humidity was usually above normal in the central and southeastern portions, particularly in the lower Ohio Valley and most parts of the Carolinas. In the Northeast, in western Texas and southern New Mexico, in most parts of the plains, and especially in the northernmost districts from western Minnesota to the Cascade Mountains the humidity was less than normal. In Colorado and thence southwestward to the southern California coast and likewise on the immediate north Pacific coast the relative humidity averaged somewhat greater than normal.

## SEVERE LOCAL STORMS OCTOBER, 1928

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the annual report of the chief of bureau]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Pawnee County, Okla.	4	4 p. m.	1,760		\$60,000	Heavy hail.	Poultry killed; crops ruined; roofs, automobiles, windows, and other property damaged; path 25 miles long.	Official, U. S. Weather Bureau.
Coffey County, Kans.	4	4-5 p. m.	15		6,000	do.	Chief damage at Le Roy where much damage to property resulted. Path 20 miles.	Do.
Mahaska County, Iowa.	4	6:15 p. m.				Tornado.	Damage to small buildings and trees reported.	Do.
Keokuk County, Iowa.	4	6:30 p. m.				do.	Considerable damage to small buildings.	Do.
Poweshiek County, Iowa.	4	do.				do.	do.	Do.
Iowa County, Iowa.	4	7:10 p. m.			2,000	Wind.	Character of damage not reported.	Do.
Cedar County, Iowa.	4	8 p. m.	440		4,000	Tornado.	Character of damage not reported. Path 1 mile.	Do.
Marion County, Iowa.	4	do.			5,000	Wind.	Character of damage not reported.	Do.
Carlinville, Ill. (near)	4	8:30 p. m.	100-200		7,000	Tornado.	Outbuildings blown down; roofs torn off; orchard trees uprooted; 1 person injured; path 5 miles.	Do.
Taylorville, Ill. (7 miles east of)	4	9:30 p. m.	440			do.	A few small farm buildings damaged or wrecked; grove badly damaged; path 1 mile.	Do.
Oconto County (central) to Marinette County (northeastern), Wis.	4	10:30 p. m.	60-880		24,000	Severe squalls.	Damage chiefly to farm property other than crops.	Do.
Clinton County, Iowa.	4				3,000	Wind.	Small buildings and trees damaged.	Do.
Morrison, Ill.	4				3,000	Severe electrical.	Light service impaired, farmhouse and shed burned.	Do.
Tallula, Ill. (near)	4				3,400	do.	2 barns struck, 1 a total loss; other minor damage.	Do.
Antelope County, Nebr. (southeastern).	10	4 p. m.				Hail and wind.	Some crops injured; roofs damaged; windows broken.	Do.
Petersburg, Nebr.	11	3:30 p. m.	3,520			Hail.	Corn flattened; poultry killed; windows broken; path 15 miles.	Do.
Finney, Scott, and Lane Counties, Kans.	11	P. m.	10		20,000	Tornado.	Many farm buildings destroyed.	Do.
Posey County (eastern) to Vanderburg County (western), Ind.	16	1 p. m.	20			do.	Many houses unroofed, some wrecked; scores of outbuildings demolished; trees and poles blown down; stock killed; path 12 miles.	Do.
Monmouth, Ill. (near)	17					Severe whirling dust storm.	Several small buildings moved from foundations; path several miles.	Do.